

Catalytic conversion of CO₂ to formate mediated by an aliphatic Pd-PCP pincer complexL. Federer¹, C. Adlhart^{1*}, C. Frech¹¹ZHAW

We report the palladium-catalyzed transformation of CO₂ and H₂ to formate at low pressure (2 bar) and ambient temperature in presence of a base. Palladium-hydride complex **1** was synthesized from its chloride precursor with NaH in THF. The ¹H-NMR spectrum shows a triplet at δ -3.40 ppm with a ²J_{P-H} coupling constant of 20.7 Hz. The formate complex **2** was obtained by exposing **1** to CO₂ as indicated by a triplet signal in the ¹H-NMR spectrum at δ 9.18 ppm with a ⁴J_{P-H} coupling constant of 1.7 Hz and a singlet signal at δ 166.6 ppm in the broadband decoupled ¹³C-NMR spectrum. After degassing of complex **2**, addition of a base and application of a H₂-atmosphere regenerated the hydride complex **1**, thus completing the proposed catalytic cycle. The formation of formic acid was confirmed by NMR and headspace GC-MS measurements after treatment with HCl.

